



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/667,526	09/23/2003	Bjoern Heismann	32860-000613/US	1448
30596	7590	03/14/2006	EXAMINER	
HARNES, DICKEY & PIERCE, P.L.C.			GAGLIARDI, ALBERT J	
P.O.BOX 8910			ART UNIT	
RESTON, VA 20195			PAPER NUMBER	
			2884	

DATE MAILED: 03/14/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/667,526	Applicant(s) HEISMANN ET AL.	
	Examiner Albert J. Gagliardi	Art Unit 2884	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 September 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) 21,24 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20,22-23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Comment on Submissions

1. This action is responsive to submissions of 24 January 2006.

Election/Restrictions

2. Newly submitted claims 21 and 24 are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: New claims 21 and 24 are directed to a different species of the device which includes two contacts for each photosensor on the rear surface of the photosensitive layer. This arrangement is unique from that of the originally examined claims wherein any second contact (i.e., common contact (3) is on the front side.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 21 and 24 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Notwithstanding the above not restriction, claims 21 and 24 are also rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the

Art Unit: 2884

application was filed, had possession of the claimed invention. Regarding new claim 21, the claim includes a limitation of a “plurality of photosensors each including an organic photosensitive layer . . . a plurality of electric contacts arranged on a rear of the organic photosensitive layer” and other elements, but there is no disclosure of any plurality of contacts for each photosensor on the rear of the organic photosensitive layer. The examiner notes that while there are disclosed a plurality of contacts (7) on the rear side of photosensitive layer (2), each of such contacts is for only a single photosensor, whereas any second contact for photosensor consists of contact layer (3) which is formed on the front side.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 1-2, 10, 12, 17-18 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kyhkynen (US 6,403,964 B1) in view of Yamazaki *et al.* (US 6,747,290).

Regarding claim 1, *Kyyhkynen* discloses (Figs. 1-3) an image detector (15) for an x-ray device, comprising: a plurality of photosensors (18), each including at least two electric contacts (50, 54) on which an electrical signal occurs upon an x-ray being detected, wherein at least one contact (54) of the photosensors is arranged on its rear side, facing away from an image source (col. 6, lines 33-35).

Regarding the material being a an organic material, it is noted that while *Kyyhkynen* does not identify the material as an organic photodiode material, the use of a variety of photosensor materials including both inorganic and organic materials are known in the art. *Yamazaki* teaches that in comparison to inorganic compounds, organic compounds have the advantage that they can be manufactured with a large area, have abundant elasticity, and superior processing properties (col. 32, lines 14-19). Therefore it would have been obvious to modify the detector disclosed by *Kyyhkynen* to utilize an organic material in order to allow for a sensor with the advantages as noted by *Yamazaki*.

Regarding claim 2, *Kyyhkynen* discloses that the photosensors form an array in a spatially distributed arrangement (see generally Fig. 1).

Regarding claim 10, *Kyyhkynen* discloses the sensors arranged on a substrate (42).

Regarding claim 12, the use of a substrate with low transparency to x-rays would have been an obvious design choice in order to protect sensitive components (see explanation regarding claims 4-5 below).

Regarding claims 17-18, the detector as recited according to claims 17-18 is suggested by the detector suggested by *Kyyhkynen* and *Yamazaki* as applied to claims 1-2 above, and is rejected accordingly.

Art Unit: 2884

8. Claims 3-9, 11, 13-16 and 19-20 rejected under 35 U.S.C. 103(a) as being unpatentable over *Kyyhkynen* and *Yamazaki* as applied above, and further in view of *Chappo et al.* (US 6,510,1950).

Regarding claim 3, *Kyyhkynen* discloses (Fig. 6) that the photosensors are arranged on a substrate (42), wherein the contacts (54) on the rear side of the photosensors are each connected to the substrate. Regarding the use of plated through holes in the substrate, although not specifically disclosed, the use of plated through holes is known in the art (see for example *Chappo* at Fig. 6, item 70). *Chappo* teaches that such an arrangement allows for the substrate and readout electronics to be contained in the same footprint thereby allowing the detector to be tailored to any size and shape (abstract).

Regarding claims 4-5, although *Kyyhkynen* does not specifically discuss the relative radiation transparency of the substrate, *Kyyhkynen* discloses that sensitive signals in the circuit board may be shielded (col. 10, lines 20-21). As such, it would have been obvious to form the substrate so as to include a material with relatively low transparency to x-rays so as to effect such shielding and thereby protect sensitive components. Absent some degree of criticality, the formation of shielding as a layer formed on the substrate would have been a matter of routine design choice within the skill of a person of ordinary skill in the art depending on the needs of the application.

Regarding claim 6, in the arrangement as suggested in view of *Chappo* (Figs. 4, 6), electric components (60) and conductor tracks (metal tracings) are arranged on the rear side of the substrate (58) and connected to the plated through holes, and wherein the photosensors are

Art Unit: 2884

driven by the electric components (60) and electric signals of the electric components are tapped off (col. 7, lines 18-48).

Regarding claim 7, the electrical components include active components such as conversion circuits (col. 7, lines 17-48).

Regarding claim 8, *Kyyhkynen* discloses a common electrically conductive layer (50) facing the image source which makes contact jointly with all the front side contacts of the photosensors (19). Although not specifically disclosed by *Kyyhkynen*, the use of a fluorescent layer on the front side of the photosensor layer is well known (see *Chappo* at fig. 6, ref. 50). Those skilled in the art appreciate that such layer allows for the x-rays to be converted to longer wavelength optical radiation which may be more efficiently detected by the photosensors, particularly organic sensors (suggestion of *Yamazaki*) which are typically not as sensitive to shorter wavelength x-rays.

Regarding claim 9, *Chappo* (see claim 3 above) suggests the substrate including a plated-through hole.

Regarding claim 11, *Chappo* (see claim 3 above) suggests the substrate including a plated-through hole.

Regarding claim 13, forming a layer with relatively low transparency on the substrate would have been an obvious design choice (see explanation regarding claims 4-5 above).

Regarding claims 14, 15, and 16, *Chappo* (see explanation regarding claim 6 above) suggests the electric components (60) and conductor tracks (metal tracings) arranged on the rear side of the substrate (58) and connected to the plated-through holes, and wherein the photosensors

Art Unit: 2884

are driven by the electric components (60) and electric signals of the electric components are tapped off (col. 7, lines 18-48).

Regarding claims 19-20, the detector as recited according to claims 19-20 is suggested by the detector suggested by *Kyyhkynen*, *Yamazaki* and *Chappo* as applied to claims 3-4 above, and is rejected accordingly.

9. Claims 22-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Kyyhkynen* and *Yamazaki* as applied above, and further in view of *Spartiotis* (US 6,703,617).

Regarding claims 22-23, although *Kyyhkynen* and *Yamazaki* as applied above do not specifically disclose a fluorescent layer, *Spartiotis* teaches that it is well known in the art and considered a functionally equivalent design choice to configure semiconductor-type radiation detectors as either direct-conversion detector or indirect-conversion detectors including a scintillator layer (col. 2, lines 31-40). Those skilled in that art also appreciate that indirect-conversion detectors often have better sensitivity because the generally thin semiconductor conversion layer has low efficiency for absorbing x-rays and/or gamma rays.

Response to Arguments

10. Applicant's arguments filed 24 January 2006 have been fully considered but they are not persuasive.

11. Regarding applicant's argument that the combination of *Kyyhkynen* and *Yamazaki* is improper because, as best understood, the *Yamazaki* reference is non-analogous art, the examiner notes that it has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed

Art Unit: 2884

invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, the *Yamazaki* reference is cited merely for the general principle that a wide variety of semiconductor materials, including both inorganic and organic materials are well known for use as photosensors. As such, the reference is considered as reasonably pertinent to the particular problem (i.e., the types of semiconductor materials useful as photosensors) with which the applicant is concerned.

12. Regarding applicant's argument that the combination of *Kyyhkynen* and *Yamazaki* is improper because, as best understood, the photodiode disclosed by *Yamazaki* could not be substituted for the photosensor disclosed by *Kyyhkynen*, the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981). In this case, the *Yamazaki* reference is cited merely for the teaching that organic materials are known for use as photosensors and have desirable properties over inorganic materials, not for the particular configuration or intended use of the photosensor material.

13. Regarding applicant's argument that there is a lack of motivation for the combination because even though the references teach advantages of using organic materials over inorganic materials in photosensing applications, there would be no motivation for the substitution because the photosensor is configured and/or used differently, the examiner notes that even though the photosensors themselves may have a different configuration or use in the different references, the recited advantages of organic materials are an inherent property of using the material itself, not

Art Unit: 2884

necessarily an advantage related to the intended use of an apparatus made with the material. In this case, those skilled in the art would readily appreciate that the recited advantages (i.e., the ability to be manufactured with a large area, the abundant elasticity (suggests low susceptibility to thermal and mechanical stress), and superior processing properties) are just as advantageous, if not more so, to photosensors for use radiation detectors as they are to photosensors used in other applications.

14. Applicant's argument regarding new claims 22 and 23 is moot in view of the new ground of rejection.

Conclusion

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

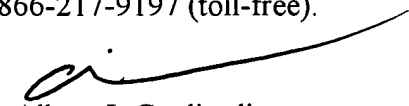
A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Art Unit: 2884

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Albert J. Gagliardi whose telephone number is (571) 272-2436. The examiner can normally be reached on Monday thru Friday from 10 AM to 6 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David P. Porta can be reached on (571) 272-2444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

16. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Albert J. Gagliardi
Primary Examiner
Art Unit 2884

AJG